may mention that the election for the Clerkenwell surveyorship, on the 19th, terminated in favour of Mr. R. L. Sibley, son of the late surveyor. He had 44 votes. The other candidates who went to the poll were Mr. Thos. Little (26), Mr. Jennings (22), Mr. Groves, and Mr. East.

ON THE NATURE AND PROPERTIES OF THE METALS USED IN THE BUILDING TRADES.

IRON.

Its intimate and essential relationship to the earth's magnetic polarity even alone would entitle iron to be regarded as, without exception, the most remarkable and important metal on the surface of our own little magnet, the earth. And, in fact, the consideration of this peculiar relationship led, very naturally, to the idea, that either the whole nucleus of the globe consisted of iron, or that an immense cosmical mass of it, at least, imbedded within the crust, could alone explain the phenomena of the polar needle; and even yet, though the modern wonders of electro-magnetism have considerably modified our ideas on this subject, it is certain that the crust itself, at all events, is so universally pervaded and impregnated with ferruginous substance, that there is scarcely a single mineral combination of which it can with certainty be anticipated that it will not be found to contain more or less iron. And not only in the mineral but in the vegetable and animal creations does it equally prevail. "It is probably generated at the first breath of the youngest creature in the world, and it is abundant in the oldest granite." It exists in the blood and tissues of animals, and in the texture of plants. "It constitutes a large proportion of mica, hornblende, and clay-slate, which, with quartz and felspar, that are seldom altogether free from iron, compose almost the whole crust of the earth. Besides this there are immense deposits of iron-ore, both in primitive and secondary countries, and some very learned philosophers have thought that the quantity of iron in the interior of the earth must be immense. It enters also, as colouring matter, into most bodies which possess colour. It is found in the ashes of vegetables and in the fluids of animals. Ferruginous dust and pyritic hailstones are sometimes showered down from the skies; and from these regions there have fallen hundreds of masses chiefly composed of iron, several of which are of great magnitude." To such evidence of truly cosmical properties in iron we might go on adding in almost endless detail,—considering that it is found in mineral waters and in the ocean,—in the most lustrous gems, in the colours of which it forms an essential element, &c. &c. But even when all natural productions are exhausted, do we not find it reappearing throughout every artificial production, manufacture, art, trade, science, and invention of the human race within the bounds of civilization, and even beyond these bounds? What article of clothing, ornament, furniture, or shelter, is it that—directly or indirectly—is not beholden to iron in its manufacture? Iron seems, as a recent chemical writer remarks, to be somehow an essential ingredient in the process of civilization. What even the golden age would be without it were hard to say, but certainly the era of natural progress is, in a much more amenable and noble sense than usual, the age of iron.

Is it to be wondered, then, that the retrospective thread of human history in the art of working iron has been lost in the myths of the most remote antiquity? Even in the theocratic era of Moses, iron was used in the manufacture of knives and swords, of axes and of tools for cutting stone; and even the furnaces for extracting the iron from its ores are spoken of as then, as now, the source of its acquisition and its manufacture. Thus, it needed not the intimation of a still earlier period, when the antediluvian Tubal-Cain was "the instructor of every artificer in brass and iron,"—or, in short, "the earliest iron-master on record,"—to assure us that at least centuries previous to the time of Moses (B.C. 1635) the iron manufacture was a regular branch of trade. In Egypt, Phrygia, Phœnicia, and subsequently Greece—into which it was introduced from Phrygia by the Dactyli,—we have records of its use in very early times, but more especially in Egypt, whence the Jewish leader Moses drew his natural "wisdom and knowledge." Yet, though Egypt then was old and used to the science, two hundred years after the Dactyli settled in Crete (B.C. 1431), and brought with them the knowledge of iron into Greece, we find that so slowly had it progressed that, during the Trojan war, no weapons were formed of iron, although then the substance itself was so highly esteemed that Achilles, at the funeral obsequies of Patroclus, offered a ball of it as a prize. Homer's knowledge, however, of its usual processes, may be seen from his striking but homely comparison of the hissing of the burning brand, when thrust by Ulysses into the eye of Polyphemus, to the effect of red-hot iron quenched in water by the smith,—that ancient son of *Vulcan* whose identity with *Tubal-Cain* is obvious enough, whether we regard him as an earth-born god, or as one of the "giants in those days—the mighty men of old," of whom King Og, of Bashan, whose iron bedstead measured 9 cubits in length by 4 in breadth, appears to have been '*ultimus gigantum*'—the latest posterity.

Thus much, then, and more than enough, of the ancient history, or rather the antiquity and mythology, of the mineral *Mars*—as the ancient chemists styled this even modern essential in military warfare. Our further remarks must be moulded, as far as possible, on a practical exemplar, although we only pretend, in the present series of articles, to give a mere compilation, from the best available professional and other authorities, of the main features and peculiarities in the nature and properties of those metals more particularly used in the building trades, and not so much to afford any direct or explicit instruction as to their practical uses in these trades. But while as practically useful as possible, we shall not hesitate to bring to notice several facts of a curious, rather than a practical tendency, and more especially facts over which the element of beauty, either in form or colour, quantity or number, cannot but shed an interest in the thoughts of every intelligent mind.

But first of the sources whence this particular metal are derived, and of its more obvious and essential properties. It exists in nature almost exclusively in the state of ores, and rarely in the metallic state, a fact which only renders it the more remarkable that its production should have formed a branch of business almost as early as the fig-leaf manufacture. The principal ores of iron are its oxides and carbonates. Others are its sulphurets, one the magnetical pyrites, the other, in which a larger quantity of sulphur contaminates the metal, yellow pyrites—"fool's gold," as it has been called, from the fact that it has frequently, even in California, been mistaken for gold, as indeed it was by Columbus himself and the Spanish grandees who bore it in triumphal procession into Madrid, and preserved it as heir looms, some of them for several generations. Pyrites is often found as an apple and concentradiate in interior crystallization. This form of it used to be called Jove's thunderbolts forged by Vulcan—fire, or sulphur—and hence called pyrites, the stone of fire. It is so hard too as to strike fire like flint. In the chemical action of its elements under ground, it is capable of simulating earthquakes. Beautiful fac-similes of leaves and other vegetable and even animal remains are often found entirely composed of pyrites, by which the organic particles have been replaced. This ore, however, is never used in the manufacture of iron. The best of all ores for that purpose are those in which the metal is simply oxidated. The ore of most abundance in the primary or oldest formations of the earth's crust is the black oxide or magnetic ore—the loadstone itself in fact, which affords the most celebrated and valuable ores of Sweden and the north of Europe, but of which the use is greatly circumscribed from its not being associated with coal. In the secondary and tertiary formations the anhydrous and hydrated peroxide—red and brown hæmatite, or blood-stone—occur occasionally in considerable quantity. It is employed in this country to some extent for mixing with the commoner ore. The ochres belong to this class of ores. When fully hydrated these are of a yellow colour, and as the water is expelled the ochre becomes gradually redder as it approaches the state of colcothar of vitriol, or calcined copperas or sulphate of iron. Hence, by various roastings, various pigments may be thus procured from one natural substance. Peroxide of iron, too, is that form of iron which pervades the blood, at least the arterial, while, on Liebig's beautiful theory, the venous, or black blood, carries off the carbon consumed in the production of animal heat, in the form of carbonate of the protoxide or black oxide of iron, to be liberated in the lungs in form of carbonic acid, while the iron protoxide is again converted there, by the oxygen of the atmosphere, into the red peroxide of the arterial blood, as a vehicle of oxygen to the carbon of the tissues, in burning which into carbonic acid, it keeps up the animal fire or heat. Thus, the oxides of iron are, to the whole animal creation, a fountain of vital heat and living energy: and iron is the only truly sanative metal in existence. So much of it exists in the blood, indeed, that the strange idea of converting it into memorial rings is said to have actually been adopted in France.

The ore that is chiefly used in the manufacture of iron, at least in this country, is the clay iron stone of the coal measures. This is essentially the carbonate of the protoxide, though mixed with variable quantities of clay and carbonates of lime, magnesia, &c. It is nodular, and often called the argillaceous carbonate of iron. It occurs in strata, beds, or bands, from two to ten and fourteen inches thick, alternating with beds of coal, clay, bituminous schist, and often limestone. The fuel and flux with which it is to be smelted are thus ever at hand. The proportion of iron in this ore varies considerably, but averages about 30 per cent.; and after calcination or expulsion of water, carbonic acid, &c., 40 per cent. A crystallized carbonate, or spathic iron, is smelted in some parts of the continent, and gives an iron often remarkable for a large proportion of manganese. The celebrated iron of Elba is derived from a specular or oligistic iron, a crystallised peroxide, forming a beautiful mineral, which Fourcroy states that Duke d'Ayen, a French chemist, once artificially produced while decomposing the green muriate of iron by heat, during which same process were yielded crystals of sublimation of the clearest and most pellucid lustre, in the form of blades of razors, with tinges of iridescent colours, bright as those refracted by the best of prisms.*

Having thus given some account of the sources whence iron is derived, we shall, in the next place, treat more particularly of its nature and properties, and of its three chief varieties—cast-iron, wrought-iron, and steel.

ST. DAVID'S CATHEDRAL.—According to *Archæologia Cambrensis*, the restoration of this venerable structure has been going on since the subscription for that purpose in 1846. The stone rood-screen has been restored, and the unsightly wood-work which surrounded it cleared away, and replaced, where necessary, by parcloses of wrought-iron. A projecting cornice of oak has been substituted for the balustrade which formerly disfigured the rood-loft. The choir arch, before walled up, has been partially opened, and the large platform before the screen and the passage into the choir, have been laid with encaustic tiles.

BRICKS.—A return obtained by Mr. Cocks, M.P., shows the duty paid on bricks in the several excise collections of England in the year 1848 to have amounted to 448,310*l.*, of which 10,386*l.* were paid in the metropolis alone.

* We may here observe that we have repeated Duke d'Ayen's experiment, but with pure muriate of iron have failed to observe the prismatic lustre. Crystals of the precise form and texture of fishes' scales were sublimed. In an experiment with other elements altogether, however, there occurred precisely such crystals as those described, some of them with stripes of the richest rainbow colours, and others of a single hue of the purest brilliancy; but what was most remarkable these crystals, even when each of a single hue, were of every imaginable colour, from the deepest blue and purple through the brightest reds and flame colours, with greens and yellows,—sublimed, all at once from one and the same material, with the same degree of heat, and simultaneously in every respect, the whole sparkling like a diadem,—certainly a curious phenomenon in optics as it still appears to be in chemistry. It is probable, therefore, that the ingredients used by Duke d'Ayen were not pure: hence his process does not appear to have even till now been successfully repeated, and, in all probability, the production of the specular ore itself was assisted by the impurities mixed up with the muriate.